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**Gospodinjski in podobni električni aparati - Varnost - 2-95. del: Posebne zahteve za pogon dviznih garažnih vrat za stanovanjsko rabo (IEC 60335-2-95:2002; spremenjen)**

Household and similar electrical appliances - Safety -- Part 2-95: Particular requirements for drives for vertically moving garage doors for residential use

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EUROPEAN STANDARD

**EN 60335-2-95**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2004

ICS 13.120;29.120.01;91.090

Supersedes EN 60335-2-95:2001

English version

**Household and similar electrical appliances –  
Safety**  
**Part 2-95: Particular requirements for drives for vertically moving  
garage doors for residential use**  
(IEC 60335-2-95:2002, modified)

Appareils électrodomestiques et  
analogues –  
Sécurité

Partie 2-95: Règles particulières  
pour les motorisations de portes de  
garage à ouverture verticale,  
pour usage résidentiel  
(CEI 60335-2-95:2002, modifiée)

Sicherheit elektrischer Geräte für den  
Hausgebrauch und ähnliche Zwecke  
Teil 2-95: Besondere Anforderungen  
für Antriebe von Garagentoren mit  
Senkrechtbewegung zur Verwendung  
im Wohnbereich  
(IEC 60335-2-95:2002, modifiziert)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

## Foreword

The text of the International Standard IEC 60335-2-95:2002, prepared by the IEC Technical Committee 61, together with the common modifications prepared by CENELEC TC 61, was submitted to the Unique Acceptance Procedure. At the Athens meeting in November 2003 it was decided to submit additional modifications from document 61(Sec)1433 to the formal vote.

This second draft was circulated in June 2004 and was approved by CENELEC as EN 60335-2-95 on 2004-09-01.

This European Standard supersedes EN 60335-2-95:2001.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-07-01
- date on which the national standards conflicting with the EN have to be withdrawn (dow) 2007-09-01

This part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric drives for vertically moving garage doors for residential use.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

NOTE 1 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 The following print types are used:

- requirements: in roman type;
- test specifications: in italic type;
- notes: in small roman type.

Words in bold in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

There are no special national conditions causing a deviation from this European Standard, other than those listed in Annex ZA to EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

p NOTE 3 In this document, p is used in the margin to indicate instructions for preparing the printed version.

### Introduction

p Add:

An investigation by CENELEC TC 61 has shown that all risks from products within the scope of this standard are fully covered by the Low Voltage Directive, 73/23/EEC. For products having mechanical moving parts, a risk assessment in accordance with the Machinery Directive, 98/37/EC, has shown that the risks are mainly of electrical origin and consequently this directive is not applicable. However, the relevant essential safety requirements of the Machinery Directive are covered by this standard together with the principal objectives of the Low Voltage Directive.

The intended use of the drives covered by this standard is for them to be installed together with doors and the necessary ancillary components (e.g. controls, safety devices) to create a power operated garage door, the safety of which is ensured by this standard and the product standard for doors EN 13241-1.

These standards are to be used as follows:

- |   |   |  |
|---|---|--|
| A | Drives that are intended to be used with specific types of doors, the limitations of which regarding e.g. load and size are specified in the instructions provided with the drive | Hazards resulting from the movement of the power operated door are covered by this standard                |
| B | Doors that are intended to be used with specific drives specified in the instructions provided with the door  | Hazards resulting from the movement of the power operated door are covered by EN 13241-1                   |
| C | Doors and drives the combination of which is not specified in the instructions provided with either the door or the drive   | Hazards resulting from the movement of the power operated door are covered by this standard and EN 13241-1 |

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**Endorsement notice**

The text of the International Standard IEC 60335-2-95:2002 was approved by CENELEC as a European Standard with agreed common modifications as given below.

**COMMON MODIFICATIONS****1 Scope**

- p Add to the paragraph starting with "This International Standard": "It does not cover hazards related to the mechanisms of the door itself or to wicket doors."
- p Delete the second sentence of Note 103.
- p Add after the second dashed item of Note 105:
- for garage doors higher than 3,5 m;
  - that are activated automatically.

**3 Definitions**

- p **3.101** In the note, delete the word "inherent".

- p **3.102** Replace the text by "Void"

- p **3.103** Replace the text by "Void". (standards.iteh.ai)

- p Add:

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**3.Z101****entrapment protection system**

part of the **drive** that provides protection against entrapment

NOTE 1 Entrapment is trapping that could result in the human body being squeezed or crushed by the door.

NOTE 2 An **entrapment protection system** may consist of one or more devices, such as pressure sensitive edges, passive infrared and active light sensing devices.

NOTE 3 An **entrapment protection system** may be incorporated in the motor assembly or be installed separately.

NOTE 4 A **biased-off switch** may be used as an **entrapment protection system**.

**3.Z102****rated operating time**

duration of uninterrupted sequence of operating cycles assigned to the **drive** by the manufacturer

NOTE An operating cycle consists of an opening and closing movement of the door.

**3.Z103****rated number of operating cycles**

number of uninterrupted operating cycles assigned to the **drive** by the manufacturer

**5 General conditions for the tests**

- p Add:

**5.7 Addition:**

*If **drives** are intended to operate beyond the ambient temperature range of +5 °C to +40 °C, the tests of Clause 20 are carried out at the most unfavourable marked temperature.*

**6 Classification**

p **6.101** Replace the text by "Void".

**7 Marking and instructions**

p **7.1** Replace the addition by:

**Drives** shall be marked with the minimum and maximum ambient temperatures in which they are intended to operate.

**Drives** supplied without a door shall be marked with:

- the **rated load** in newtons or in newton-metres;
- the **rated operating time** in minutes, unless the **drive** is intended for continuous operation.

**Drives** supplied with a door shall be marked with the **rated number of operating cycles**, unless the **drive** is intended for continuous operation.

Devices used in the **entrapment protection system** to be installed separately shall be marked at least with the manufacturer name and type or model identification.

p Add:

**7.6 Addition:**

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Upper limit of temperature (ISO 7000/0533)



Lower limit of temperature (ISO 7000/0534)

p **7.12** In the fifth dashed item, replace "40 mm" by "50 mm" and add "(for **drives** incorporating an **entrapment protection system** depending on contact with the bottom edge of the door)".

p Add:

The instructions shall

- indicate which maintenance operations can be performed by the user;
- identify critical maintenance operations which may prove hazardous;
- specify the minimum frequency for any maintenance operation.

p **7.12.1** In the second paragraph, delete "including any non-inherent protection device".

p Add to the second paragraph:

"... and the necessary limitations, e.g. load and size of the doors."

p Add after the third dashed item:

NOTE Z101 If removable, the actuating member should be stored in direct vicinity of the door.

p In the last dashed item, replace "40 mm" by "50 mm" and add "(for **drives** incorporating an **entrapment protection system** depending on contact with the bottom edge of the door)".

p Add the following dashed items:

- after installation, ensure that the parts of the door do not extend over public footpaths or roads;
- after installation, ensure that the drive prevents or stops the opening movement when the door is loaded with a mass of 20 kg, fixed centrally on the bottom edge of the door (for **drives** that can be used with doors having openings larger than 50 mm in diameter).

p Add:

#### 7.15 Addition:

When it is not practical for the marking to be visible after the **drive** has been installed, the marking shall also be included in the instructions.

p 7.101 Replace the second paragraph and the note by:

The text may be replaced by the warning sign shown in Figure 102.

p 7.102 Replace "**Drives**" by "**Drives** incorporating an **entrapment protection system** depending on contact with the bottom edge of the door" and replace "40 mm" by "50 mm".

p Add:

**7.Z101** If the **drive** is intended to be installed higher than 2,5 m above the floor or other access level, the packaging shall be marked accordingly. This information shall also be given in the installation instructions.

*Compliance is checked by inspection.*

**7.Z102** If the **drive** is not to be used with doors having openings exceeding 10 mm in diameter or having edges or protruding parts a person could grip or stand on, the packaging shall be marked accordingly. This information shall also be given in the instructions.

*Compliance is checked by inspection.*

## 11 Heating

p 11.7 Replace the text by:

**Drives** for continuous operation are operated for consecutive operating cycles until steady conditions are established.

Other **drives** are operated as follows:

- **drives** supplied without a door are operated without rest periods for the **rated operating time** but for not less than three cycles of operation or 4 min, whichever is longer;
- **drives** supplied with a door are operated without rest periods for the **rated number of operating cycles** but for not less than three cycles of operation.



## 15 Moisture resistance

- p Replace the text by:

This clause of part 1 is applicable except as follows:

### 15.1.2 Addition:

*IPX4 tubular **drives** are installed in a tube that is open at both ends and has the largest diameter specified in the instructions. The tube has a length twice that of the motor and is mounted on a support as in normal use. The support is rotated at a speed of 1 rev/min.*

## 19 Abnormal operation

- p Add:

### 19.1 Addition:

*Compliance is also checked by the test of 19.Z101.*

- p **19.10** Replace the text by:

*Addition:*

*The test is continued for one cycle of operation if this is longer.*

- p Add:

### 19.11.2 Addition:

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*If the **drive** can be operated when any of the fault conditions are simulated, the tests of 20.Z101 to 20.Z103 are carried out, the **drive** however being supplied at **rated voltage**.*

*The average forces specified in 20.Z103.1 may be exceeded but they shall not be greater than 600 N during the first 2 s after the force has exceeded 150 N, and shall not be greater than 150 N thereafter.*

- p **19.13** Delete the addition.

- p Add:

**19.Z101** ***Drives** marked with a **rated operating time** or a **rated number of operating cycles** are supplied **at rated voltage** and operated continuously under **normal operation**.*

*During the test the winding temperatures shall not exceed the values specified in 19.9.*

## 20 Stability and mechanical hazards

- p **20.101** Replace the first paragraph by:

**Drives** shall prevent doors from closing unexpectedly during normal use.

- p **20.102** Replace the text by "Void".

- p **20.103** Replace the text by "Void".

- p **20.104** Replace the text by "Void".

p **20.105** Replace the text by "Void".

p **20.106** Replace the text by "Void".

p **20.107** Replace the text by "Void".

p Add:

**20.Z101** Drives controlled by a **biased-off switch** shall have limited operating speed and shall stop when the actuating member of the switch is released.

*Compliance is checked by the following tests.*

*The **drive** is installed with a door and supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**. It is operated to close the door.*

*The speed of the door, measured between the bottom edge of the door and the opposing edge (floor), shall not exceed 0,5 m/s.*

*When the actuating member of the switch is released, the bottom edge of the door shall stop before it has moved more than 50 mm.*

*The test is repeated during the opening movement of the door.*

*The requirement for the door to stop within a distance of 50 mm only applies if the closing force exerted by the door exceeds 150 N, as measured in 20.Z103.1.*

**20.Z102** Drives incorporating an **entrapment protection system** with sensing devices which prevent the bottom edge of the door coming into contact with an obstacle shall not cause injury resulting from a moving door.

*Compliance is checked by the following test.*

*The **drive** is installed with a door, the force exerted by the **drive** being adjusted to the maximum indicated on the **drive**. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.*

*An obstacle having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass of 20 kg  $\pm$  0,5 kg is placed on the ground under the closing door in the most unfavourable orientation.*

NOTE The obstacle is normally made of rough wood and painted white but other materials and colours may be used to simulate the most unfavourable conditions.

*The **drive** is operated to close the door. The door shall stop or reverse its movement without contacting the obstacle.*

*The test is repeated with the obstacle being moved under the closing door at a speed of 3 m/s  $\pm$  0,6 m/s.*

*The tests are repeated with the obstacle placed on its side so that its height is 200 mm.*

*The obstacle, in its vertical position, is then raised in increments up to the height of the door, but not higher than 2,5 m. At each increment, the **drive** is operated to close the door. The door shall stop or reverse its movement without contacting the obstacle.*

*The obstacle, in its vertical position, is placed at any location next to the closed door. The **drive** is operated to open the door. The door shall stop or reverse its movement without contacting the obstacle.*

**20.Z103** Drives incorporating an **entrapment protection system** which reacts to the door contacting an obstacle shall not cause injury resulting from a moving door.

Compliance is checked by the test of 20.Z103.1 for a closing movement and, if the **drive** is supplied with a door, by the test of 20.Z103.2 for an opening movement.

**20.Z103.1** The **drive** is installed with a door, the force exerted by the **drive** being adjusted to the maximum indicated on the **drive**. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.

The **drive** is operated to close the door from the fully open position and the **entrapment protection system** shall limit the vertical component of the closing force to

- 150 N during the first 5 s after the force has exceeded 25 N,
- 25 N thereafter;

or

- 400 N during the first 0,75 s after the force has exceeded 150 N,
- 150 N during a further period of 4,25 s,
- 25 N thereafter;

or

- 600 N during the first 2 s after the force has exceeded 150 N,
- 150 N during a further period of 3 s,
- 25 N thereafter.

The force is measured by means of an instrument which incorporates a rigid plate having a diameter of 80 mm and a spring having a ratio of 500 N/mm  $\pm$  50 N/mm. The spring acts on a sensing element which is connected to an amplifier having a rise and fall time not exceeding 5 ms. The measuring instrument shall be accurate within 5 %.

The force is measured on the bottom edge of the door at the following heights above the ground:

- 50 mm,
- 300 mm,
- 500 mm,
- 2 500 mm, or 300 mm below the maximum opening height of the door if this is less than 2 800 mm.

At each height, the force is measured at the following locations:

- in the centre of the bottom edge of the door,
- 200 mm from each end of the bottom edge of the door.

The test is carried out three times and the average closing force is calculated for each location.

If the measured force exceeds 400 N during 0,75 s or 150 N during a further period of 4,25 s, the following test is carried out to detect stationary and moving obstacles.

An obstacle having dimensions of approximately 80 mm x 300 mm and a height of 100 mm is placed on the ground and centrally across the door opening.

The **drive** is operated to close the door. The door shall not start moving or shall reverse its movement when detecting the obstacle.

The test is repeated with the obstacle positioned at 100 mm from each end of the door opening in turn.

A cylindrical obstacle, having a diameter of 50 mm and a length of 850 mm, is suspended by one end 900 mm above the ground and centrally in the door opening.

The **drive** is operated to close the door and the cylinder is swung across the door opening from an angle of 45°. The **entrapment protection system** shall detect the obstacle and cause the door to reverse its movement.

**20.Z103.2 Drives** intended to be used with a door having openings exceeding 10 mm in diameter or having edges or protruding parts a person could grip or stand on are subjected to an opening test, the door being provided with a load. The force exerted by the **drive** is adjusted to the maximum indicated on the **drive**. The load has dimensions of approximately 200 mm x 200 mm x 200 mm, a mass of 20 kg, and is fixed centrally to the outside of the door with one edge adjacent to the bottom edge of the door.

The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage** and operated to open the door. If the bottom edge of the door moves more than 500 mm, the load is replaced by a test piece having dimensions of approximately 200 mm x 300 mm, a height of 700 mm and a mass not exceeding 20 kg, with the 300 mm edge adjacent to the bottom edge of the door.

The **drive** is again operated to open the door. The movement of the door shall stop before the test piece comes into contact with the lintel.

**20.Z104 Entrapment protection systems** shall provide an adequate level of protection in the event of a failure within the system.

Compliance is checked by the following test, unless the **entrapment protection system** is a **biased-off switch**.

The **drive** is installed with a door and supplied at **rated voltage**. The **drive** is operated to close the door. During the movement, a short circuit or open circuit is simulated in the system or in the installation wiring, with the exclusion of the mains supply wires.

Unless the **entrapment protection system** continues to operate normally, the door shall stop moving or the movement of the door shall only be controlled by a supplementary **biased-off switch** after the door has completed its movement.

The test is repeated during the opening movement of the door.

If the **entrapment protection system** continues to operate normally, the test is repeated with an additional fault simulated.

NOTE It may be necessary to simulate several faults before the test is completed.

**20.Z105** A mechanical fault in the **drive** shall not result in a hazardous operation.

Compliance is checked by inspection and if necessary by test.

The inspection shall evaluate which parts can affect the safety of operation and whether they are likely to break or become loose. These parts may be within the **drive** or used for connecting the **drive** to the door.

NOTE Examples of parts which are evaluated are screws, pins, shafts, wheels, chains and supporting parts.

If the inspection cannot determine whether the **drive** will continue to operate normally or stop its movement when the part has failed, the following test is carried out.

The **drive** is installed with a door, the force exerted by the **drive** adjusted to the maximum indicated on the **drive**. The **drive** is supplied at the most unfavourable voltage between 0,94 and 1,06 times **rated voltage**.

The faults are introduced one at a time and the **drive** is operated as in normal use.